

accident" as he confesses; (*b*) that he regarded it as air containing nitrous particles; (*c*) that he remained in complete ignorance of its nature till March, 1775, before which time Lavoisier was well acquainted with its principal properties, and had recognised many of its functions.

10. "Cavendish discovered hydrogen in 1784." On the contrary, he described it in his "Experiments on Fictitious Air," published in 1766.

11. "Davy abjured Lavoisier's *principe oxygène*, and by his numerous discoveries gave the chemical edifice so rude a shake that it had to be taken down and rebuilt." From our point of view, *in spite* of the numerous discoveries of Davy, the edifice erected by Lavoisier, and which is still standing, had not to be taken down and rebuilt, except in one small part. The theory of acidification was a small part of Lavoisier's labours, and it was Berthollet who called chlorine *oxy muriatic acid*, and who thought that he had proved it to be a compound of muriatic acid and oxygen.

12. Mr. Tomlinson after asserting that "chemistry has no nationality," and "that discoverers are mutually dependent," goes on to say with strange inconsistency that chemistry "had no proper existence for us until Dalton discovered its laws." Surely this is almost as if he slightly altered the "complacent statement of Wurz," and said, "Chemistry is an English science; it was founded by Dalton of immortal memory." We do not think that many will differ from us when we say that chemistry was a science long before the time of Dalton.

Thus we have endeavoured to show that of the nine dogmatic assertions given above (numbered 4-12) :—*one*, viz. 9, is correct; *three*, viz. 7, 8, and 11, are open to grave question; while *five*, viz. 4, 5, 6, 10, 12, are altogether erroneous.

There is no possible excuse for us to remain any longer in ignorance of the mighty works done by Lavoisier. The fine quarto volumes, 1862-1868, published by the French government, are a fitting monument to the genius of the man. The petty jealousies which disfigure the history of science during the end of the last, and commencement of the present century, ought to find no place in our minds. The Republic of Science is large enough for every man to receive his due.

G. F. RODWELL

The Comet

IT would scarcely perhaps be civil to take no notice of Mr. Backhouse's letter in NATURE, vol. xxvii, p. 52, the object of which seems to be principally to discredit my account of the disappearance of the comet in a moonlit sky. Still less, however, would it be reasonable to take offence at it—albeit, Mr. Backhouse is wrong. Indeed, a little more reflection might have shown him that ample time having elapsed without any correction from me appearing in your columns, the presumption must have been strong that I had nothing to correct. I have in fact seen the comet frequently since—as well as many times before—and am moreover really experienced enough not to have made quite so gross a blunder; or at least to have found it out, if I did make it, when so many subsequent opportunities permitted. Besides that, I have fortunately the following testimony in corroboration. One of my sisters wrote, "What you did not see of the comet agrees exactly with F.'s experience. She looked out at Court-Lodge: splendid night; many, even small, stars, though moon shining bright; but the comet *wasn't to be seen*, though she and Miss B. scanned the whole fine expanse of east and southeast sky." Another wrote about the same time that though visible two days later, it was so pale that she did not wake a nephew who wished to see it. My drawing of the 23rd October has two stars above the nucleus, with one of which it made the base of an isosceles triangle, the other being at the vertex. These two stars were plainly visible all the morning of the 30th, but not so high above the roof across the way, but what the motion of the comet since I last saw it (23rd) may have lowered it enough to conceal the nucleus. In fact, either I am wholly right as to the disappearance, nucleus and all, under moonlight, or at least the nucleus must have been concealed. There is no other alternative. As to the great sweep of tail—let us be reasonable in our guesses as to the fallibility of others however improbable their evidence. May not something for instance be ascribed to the London atmosphere as likely to increase the amount of moonlight reflected? It was for this that I wished the observation made public, *viz.* as a real phenomenon having a real cause; all the more interesting that it was so surprising—nay, as it seems, so incredible. My only regret is that I have been now tempted into so long a reply.

Before I leave the comet, may I presume to express my surprise that the question as to this comet's return is still *sub judice*. It is said that three well observed places are enough to determine the elements of a comet's orbit. But this one has surely furnished more nearly a score since its perihelion, to say nothing of those before—which no doubt belong to a previous orbit. It is not without fear that I may be misunderstood, that I ask of those who are skilled in such things for an explanation, knowing that of all men they are most deeply interested in the early solution of such a question. It may be said that the observations at and about the time of perihelion have scarcely yet reached this country; but is not the fact that the comet was at one time, which I imagine is known with some certainty, *behind the sun's disc*, equivalent to an observation of its place sufficiently exact to rank with others in calculating the orbit? I do not presume to say that it is so. I merely formulate a question which, in its general bearing, must surely be agitating the minds of many besides myself, after all we have read about the possible past history and future fate of this remarkable comet. It has now been under observation during two months, in which time it must have traversed nearly one quarter of its entire orbit, if an elliptical one of moderate extension. Its present path in space must be so nearly straight that continued observation can hardly be expected to furnish improved data until, if ever, departure from that shall settle the question decisively in favour of an elliptical path. But is it for this that we must wait? I can hardly think so, for surely no comet has ever yet been seen in the neighbourhood of aphelion.

J. HERSCHEL

30, Sackville Street, November 18

An Urgent Need in Anthropology

BOTH zoology and geology possess a yearly "record" of the work achieved in their respective domains, but anthropology still remains without that aid to its proper advancement. All workers are of course cognisant of the current bibliography given in the German anthropological publications, and the supplemental information on the same subject contributed by Dr. O. Mason in the *American Naturalist*, and are not unappreciative of the same; but these lists are but partial, and necessarily incomplete, as must be evident when the peculiar nature and wide scope of the study of man is taken into consideration.

Compared with anthropology, the record of zoological work is simple in the extreme. Zoology possesses its accredited organs and regular channels of publication, and with trifling exceptions, its yearly work can be gleaned from these sources. But what is anthropology? It may be described as the very Talmud of humanity with its "Mishnah" of ethnological facts, and its "Gemara" of anthropological conclusions. Scattered up and down the bye-ways of literature, here and there recorded by the traveller, illustrated by the historian or accentuated by the essayist, hidden in blue-books, and awaiting extraction from medical reports, existing in the papers of the missionary and the publications of the statisticians are the unaccumulated and unrecorded facts and observations which form the foundation on which to rear a complete science of man. Our own savages afford as excellent illustrations of the comparative in civilisation as do the primitive peoples of the jungle or the swamp, and hence a large fund of information is still to be supplied and tabulated from our city alleys, prisons, and lunatic asylums. To the question, Is such a record needed? must be added, How is such a record possible?

It seems at once clearly impossible that such a work could be either intrusted to the care of one man, or to the men of one nationality. No individual can be expected to have perused the whole current literature of his country, and could such a phenomenon be discovered, it is still more unlikely that he would combine in himself those qualities which are necessary to detect the varied data that make for anthropology. An alternative course, however, is present, which is possible, and not too exhaustive as regards time and labour. In each country where anthropology is cultivated as a science, a few of its votaries could form an association for the purpose of abstracting from its literature such facts, arguments, and observations as appertain to the study of man, and these might, in a condensed and tabulated form, appear as a regular yearly contribution in the pages of the different publications of the varied ethnological and anthropological societies which now embrace so many nationalities. It is perhaps not presumptuous to say that these papers would not be the least valuable in the volumes in which they appeared. It seems work that anthropological societies might

justly undertake, and we might then expect to hear less of the little interest felt in the science by the general public. When we have an "applied anthropology" to our daily life, and a system of anthropology taught in our public schools, we shall wonder how it was that the science so long remained in the esoteric stage. However, paradoxical as it may seem for the writer to admit, no science has been illustrated by so many excellent handbooks and compendiums as anthropology. From the time of Prichard to the works of Lubbock, Peschel, and Tylor, there have always been competent workers and writers, and the last-named works represent the very essence of our knowledge on the subject. In the face of this there is still a vast and unrecognised mass of material waiting extraction from the total annual literature of each country.

One other work requires compilation, and refers to the past. How frequently a traveller or missionary, anxious to write fully on the people he has visited, and wishing at the same time to have his views enlarged by the opinions of others, inquires for the list of authors and authorities who have written on the same subject. With very few exceptions such a desideratum is unprocureable, and yet if we would at present understand the social position of any tribe, however degraded or improved, the records of their earliest visitors must be compared with the narratives of their latest describers. This again can only be the work of a specialist, who, having carefully searched for and studied the literature relating to some particular tribe or race, would voluntarily present his "bibliography" to students at large, and for that purpose endeavour to have the same published by his local or some other anthropological society. These lists, if once begun, would slowly accumulate, and would not only confer lasting fame on their compilers, but also, by their publication in the *Transactions* of the societies devoted to the study of man, make the contents of those works more valuable by their presence, and at the same time promote the absence of some memoirs which further knowledge of the subject would render somewhat unnecessary.

It is, however, only in the hope of further suggestions from other workers, that I have ventured to obtrude these remarks in the columns of NATURE.

W. L. DISTANT

A Modification of the Gold-leaf Electroscope and a Mode of Regulating its Charge

THOSE who experimentalise with the usual form of gold-leaf electroscope must know well that the instrument requires a vast amount of preparation and drying before it is ready for use, and also that in wet weather it keeps its charge but a little while. At the same time the electroscope when in good order is a beautifully sensitive instrument and of great value in demonstration. I have made a slight addition to the present form of instrument, which makes it useful in all states of the weather. A flat spiral is cut out of sheet ebonite with a fret saw, about 8 mm. wide, and 4 mm. thick; the diameter of the spiral is the same as the internal diameter of the glass shade; the spiral is cemented to the shade just below the line at which its dome begins; the centre of the spiral carries the brass rod to which the gold leaves are attached; the rod comes up through the top of the shade without touching it; thus a very long insulator is placed between the charged leaves and the surface of the shade; on a damp day the leaves are powerfully divergent two to three hours after being charged. If instead of the spiral a little tube of ebonite takes the place of the usual varnish glass tube, the charge will be kept a fairly long while.

If the same angle of divergence of the gold leaves be required in two similar electroscopes, charged, say, with electricity of opposite sign, this can be effected by fully charging each instrument, and then bringing a lighted candle about ten centimetres above the brass disc or knob of each; by lowering or raising the candle, the charge can be drawn off as slowly as you please. It is well known that a flame has been used ATTACHED to an electrometer in testing atmospheric electricity. Volta used a flame connected to an exploring rod, and in Sir W. Thomson's electrometer a slow-burning match is used; but it will be noticed that in the experiment I have described for regulating the charge, the flame is only held near the disc or knob, but is NOT allowed to TOUCH IT. I also find, and it is very remarkable, that electroscopes can be fully charged by placing them about a metre from a charged jar, if a taper be now placed on the top of the jar, by means of an insulator the leaves instantly diverge and the electroscopes remain charged.

FREDERICK JOHN SMITH

Taunton, November 18

Palæolithic Gravels

THE subject of the preservation of human remains in drift beds has been so fully discussed by every author who has written on the antiquity of man, that it would be mere waste of space to reprint what has been so many times printed before. No doubt the day will one day arrive when we shall have plenty of examples of the osseous framework of palæolithic man; at present but few of his bones have been found for study. Human bones are extremely liable to decay, but no doubt some of our palæolithic precursors are preserved somewhere; they will be lighted on some day.

In 1878 I had an opportunity of removing the stones from several cairns at Cynwil Gaio, in Carmarthenshire; the kist-vaens or stone graves were then exposed. On carefully removing the covering stones from each kist, the place in which the human body was originally deposited was laid bare. The soft, smooth bed of fine clay (brought from a distance) was there on which the body was placed at the time of burial, but not in a single instance was there a trace of a bone, a tooth, or any relic whatever of the body; it had entirely vanished. Now if we can find nothing in a grave that is only a very few thousands of years old, what can we expect from one that is tens or possibly hundreds of thousands?

When Prof. T. McK. Hughes lectured on the Antiquity of Man before the Victoria Institute he said (reprint p. 8): "I will not waste time to discuss whether the objects we refer to man, now found in numbers in post-glacial river-gravels, are really of human work." The Professor was quite right, for any one who can see any art in the Parthenon, or any human work in Raphael's Cartoons, ought to see art in paleolithic implements; and, of its class, uncommonly good art too. But none are so blind as those who won't see, and many persons have not strength of mind or courage enough to accept the teaching of their own reason.

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Ancient Monuments

WHILST in North Wales last autumn, I visited the famous Kist-Vaen, on Tynycoed Farm, Capel Garmon, not far from Bettws-y-coed. This is a sort of double subterranean cromlech, the single cap-stone now remaining being on a level with the ground. On two of the large upright supporting stones, two blockheads had painted their names in green oil-paint from top to bottom of the stones. The trouble of taking the green paint and brushes to this place must have been considerable, and I hope now that General Pitt-Rivers is appointed Inspector of Ancient Monuments, he will find these parties out, and make them take a paifful of turpentine, and rub out the offensive inscriptions.

I also visited the two circles of stones, termed on the Ordnance Map Maenan-hirion, by Penmaenmawr, and looked out for the two outlying stones stated to be on the north-east side of the larger circle. I could not see them; there is a large naturally-imbedded boulder on the east-south-east side, but the intermediate one has been removed. Whilst I was at the smaller circle, I noticed that one of the stones had recently been pulled out of its setting, and was lying beside the hole.

The great camp on Penmaenmawr was plentifully bestrewn with sandwich papers and empty bottles, but the immense walls and hut circles of our forefathers defy the efforts of excursionists to a great extent. I, however, saw several of these terrible persons on the top, taking off the stones from the ancient walls and throwing them down below.

I noticed several other stones in the neighbourhood of the circles that had recently been thrown over.

In some of the more romantic and rocky situations in Wales—places visited by "cheap trips" (as near Bettws)—the rocks and even highly-esteemed antiquities—as the elaborately carved roadside cross at Carew, Pembrokeshire—are plastered over with printed bills about auctions, tea-meetings, sermons, and quack medicine.

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Shadows after Sunset

IN reference to Mr. Douglas Archibald's letter, I may say that in 1873 I made three drawings of the "Sheaf rays" at the Isle of Wight. In these they are marked as "con-